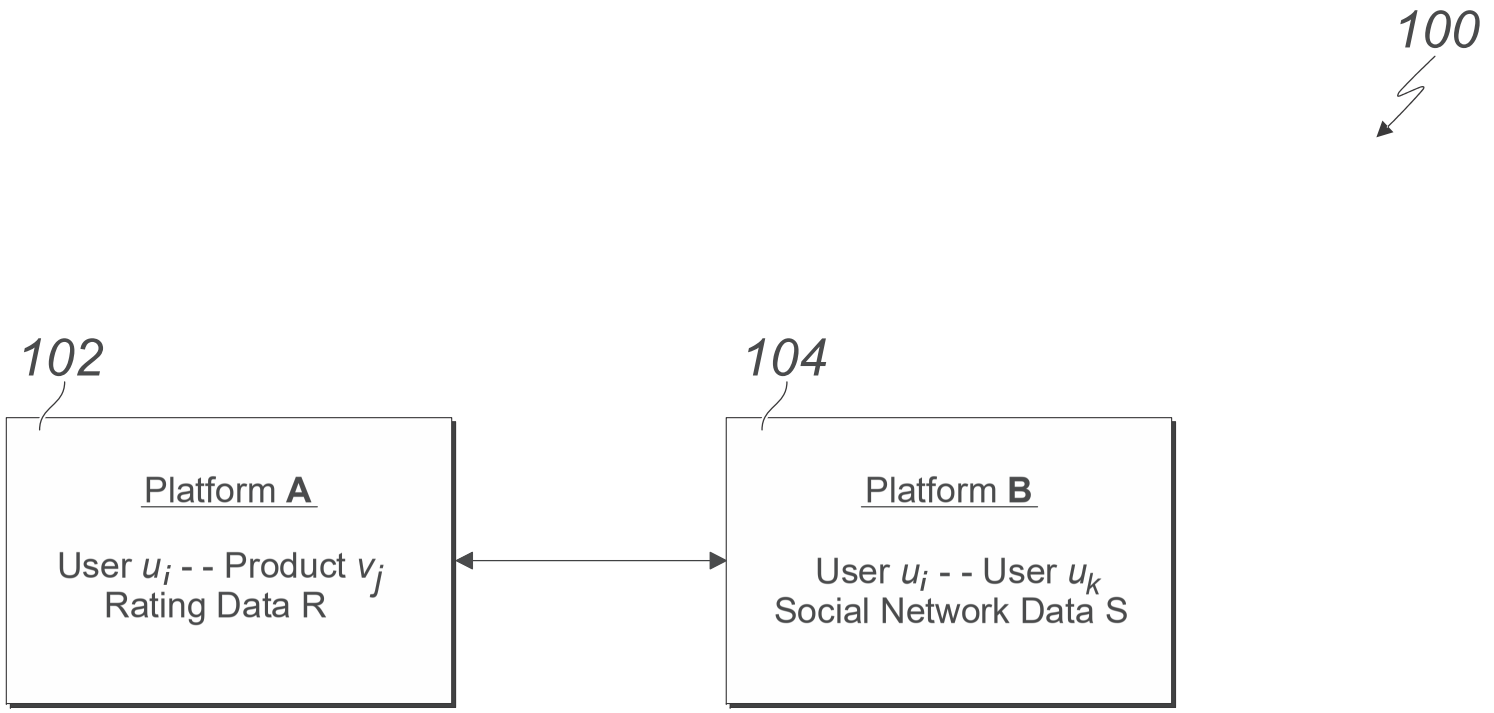
100
102
104
Platform A
User u_i - - Product v_j
Rating Data R
Platform B
User u_i - - User u_k
Social Network Data S

FIG. 1

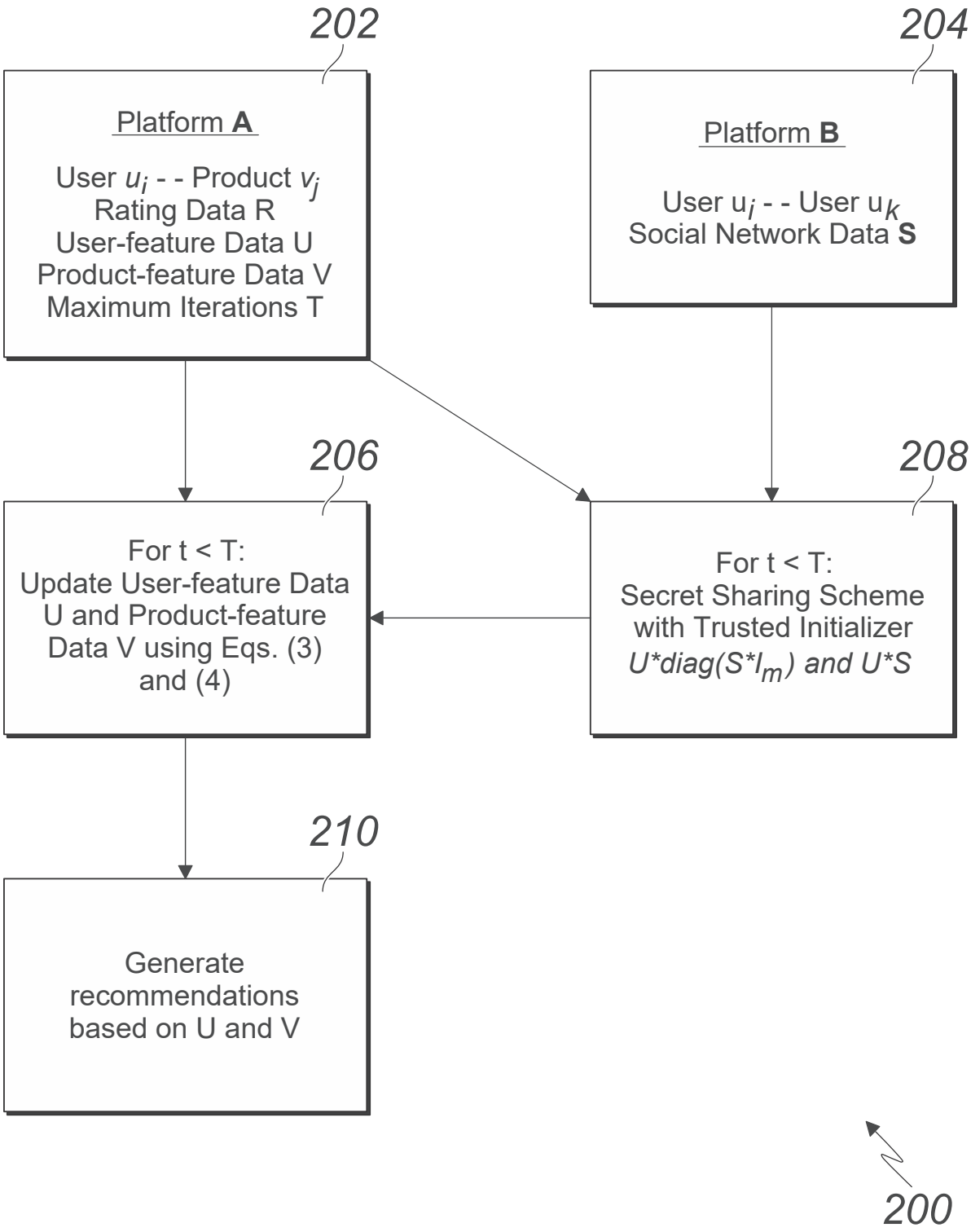
202
Platform A
User u_i - - Product v_j
Rating Data R
User-feature Data U
Product-feature Data V
Maximum Iterations T
204
Platform B
User u_i - - User u_k
Social Network Data S
206
For t < T:
Update User-feature Data U and Product-feature Data V using Eqs. (3) and (4)
208
For t < T:
Secret Sharing Scheme with Trusted Initializer
$U*diag(S*I_m)$ and $U*S$
210
Generate recommendations based on U and V
200

FIG. 2

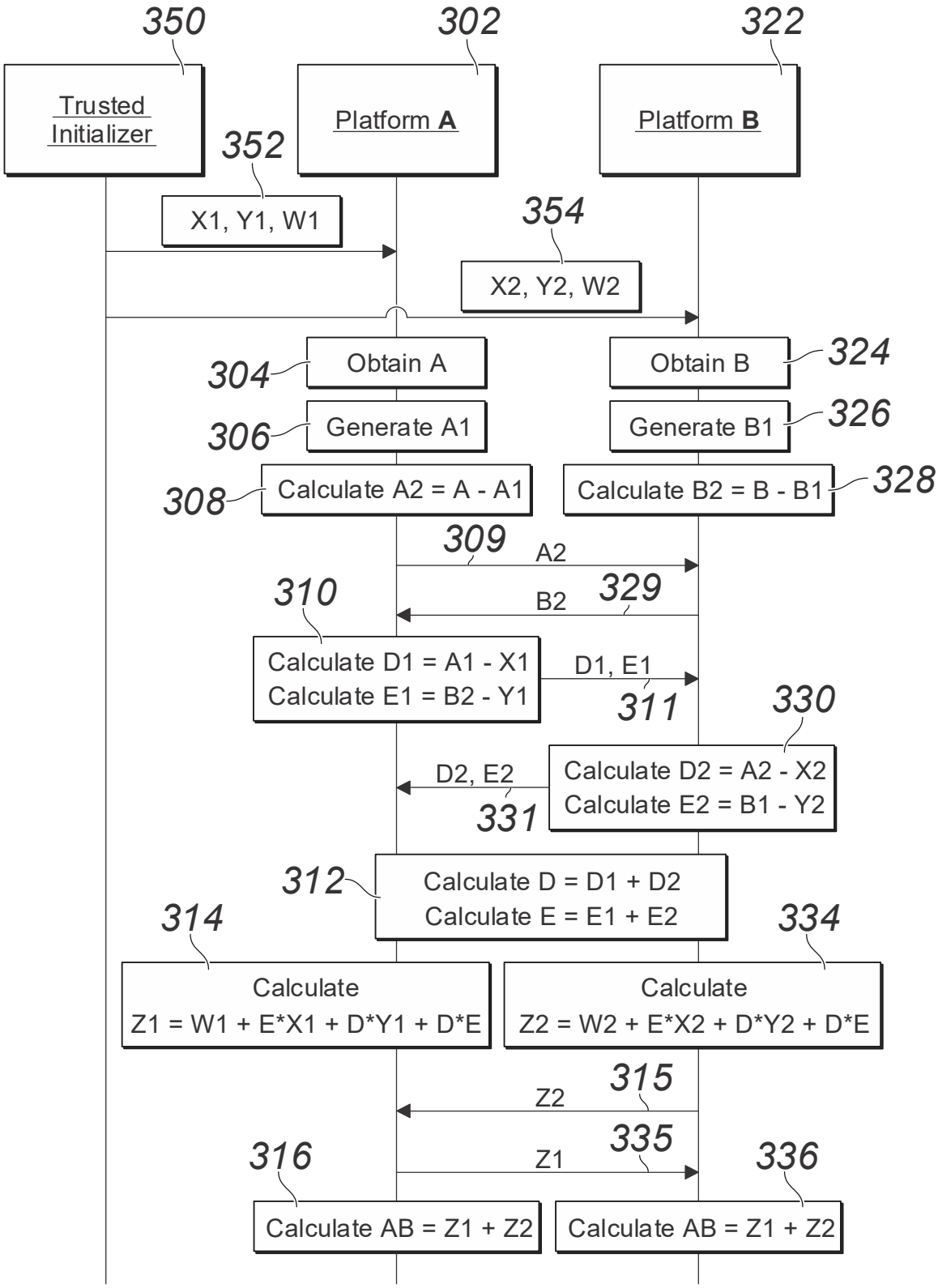
350
302
322
Trusted Initializer
Platform A
Platform B
352
X1, Y1, W1
354
X2, Y2, W2
304
Obtain A
Obtain B
324
306
Generate A1
Generate B1
326
308
Calculate A2 = A - A1
Calculate B2 = B - B1
328
309
A2
310
329
B2
Calculate D1 = A1 - X1
Calculate E1 = B2 - Y1
D1, E1
311
330
D2, E2
331
Calculate D2 = A2 - X2
Calculate E2 = B1 - Y2
312
Calculate D = D1 + D2
Calculate E = E1 + E2
314
334
Calculate
Z1 = W1 + E*X1 + D*Y1 + D*E
Calculate
Z2 = W2 + E*X2 + D*Y2 + D*E
315
Z2
335
316
Z1
336
Calculate AB = Z1 + Z2
Calculate AB = Z1 + Z2

FIG. 3

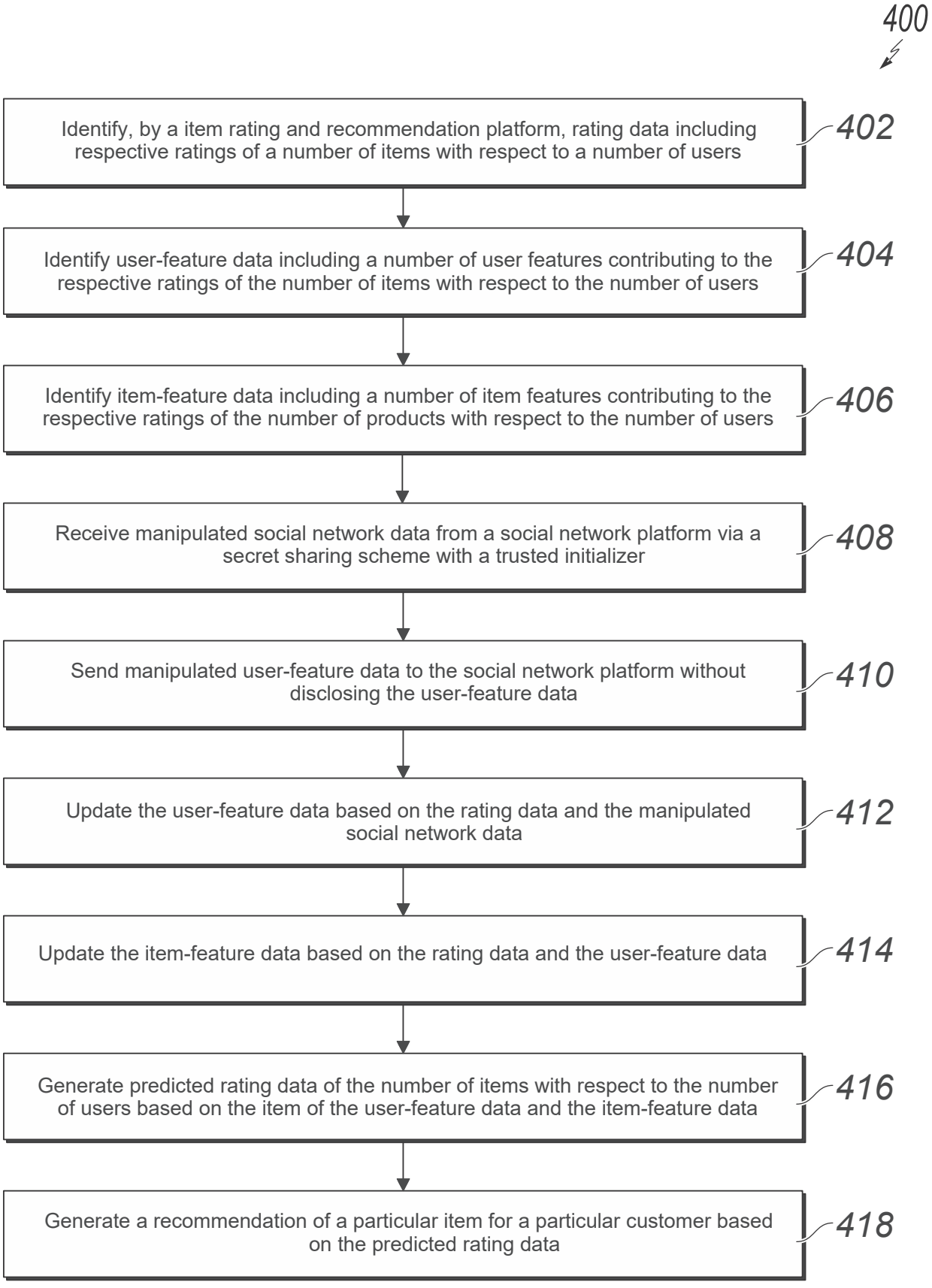
400
Identify, by a item rating and recommendation platform, rating data including respective ratings of a number of items with respect to a number of users
402
Identify user-feature data including a number of user features contributing to the respective ratings of the number of items with respect to the number of users
404
Identify item-feature data including a number of item features contributing to the respective ratings of the number of products with respect to the number of users
406
Receive manipulated social network data from a social network platform via a secret sharing scheme with a trusted initializer
408
Send manipulated user-feature data to the social network platform without disclosing the user-feature data
410
Update the user-feature data based on the rating data and the manipulated social network data
412
Update the item-feature data based on the rating data and the user-feature data
414
Generate predicted rating data of the number of items with respect to the number of users based on the item of the user-feature data and the item-feature data
416
Generate a recommendation of a particular item for a particular customer based on the predicted rating data
418

FIG. 4

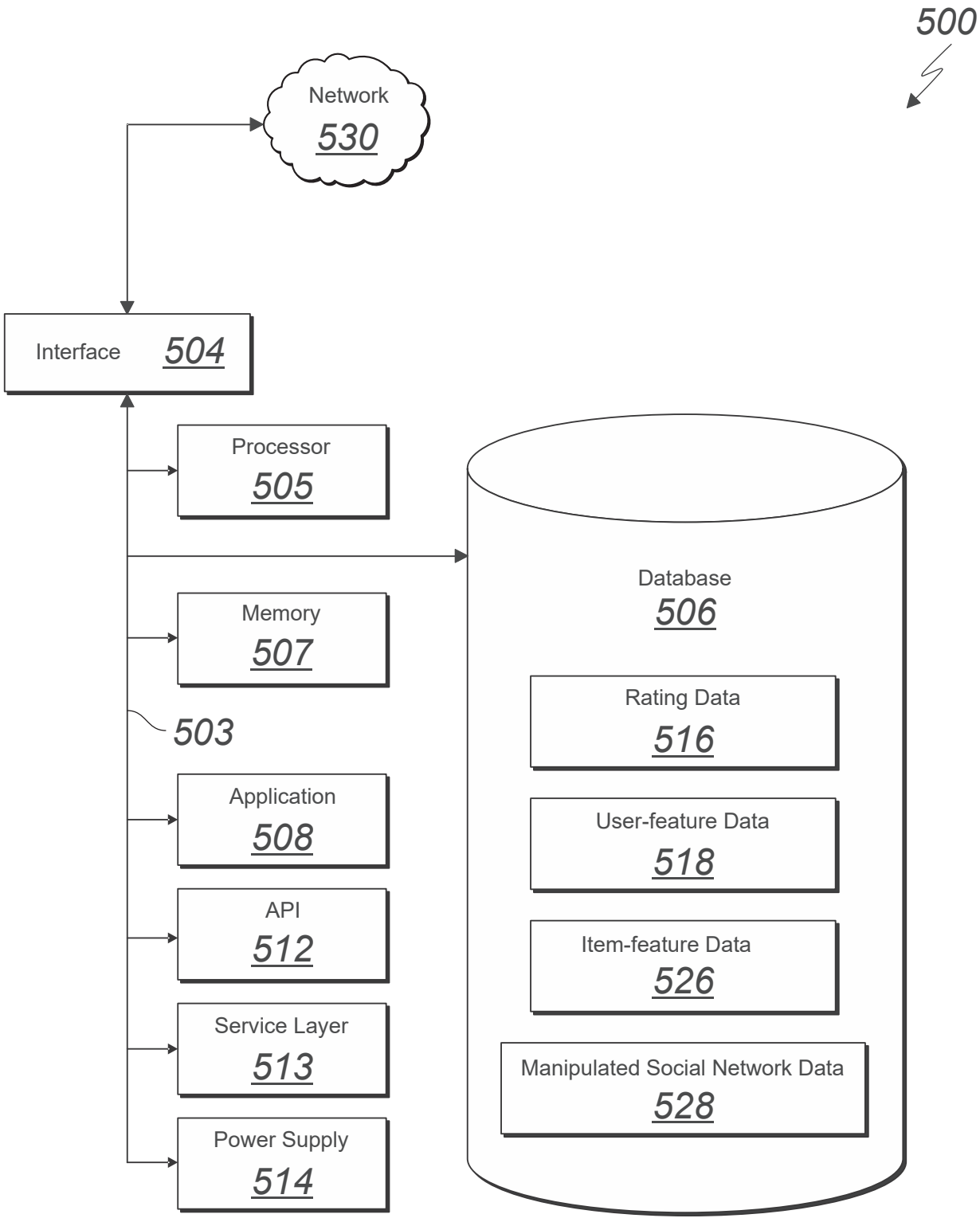
500
Network
530
Interface
504
Processor
505
Memory
507
503
Application
508
API
512
Service Layer
513
Power Supply
514
Database
506
Rating Data
516
User-feature Data
518
Item-feature Data
526
Manipulated Social Network Data
528

FIG. 5